PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of)
)
Odenwalder, et al.)
)
Serial No. 09/981,027)
)
Filed: October 15, 2001)

) For: Method and Apparatus for
) Processing Shared Subpackets
) in a Communication System
)
) Group Art Unit: 2661

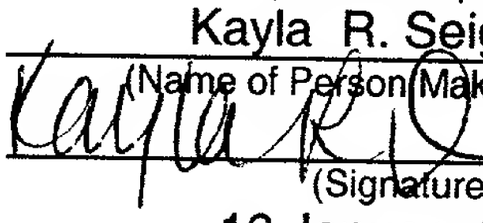
COPY OF PAPERS
ORIGINALLY FILED

PRELIMINARY AMENDMENT

BOX NON-FEE AMENDMENT
Commissioner of Patents
Washington, D.C. 20231

Dear Sir:

The following is a preliminary amendment of the above-identified application. Please amend the above-identified application as indicated below.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Assistant Commissioner of Patents, Washington, D.C. 20231, on:
16 January 2002
(Date of Deposit)
Kayla R. Seignious
(Name of Person Making Deposit)

(Signature)
16 January 2002
(Date of Signature)

Attorney Docket No.: PA020032
Customer No. 23696

IN THE SPECIFICATION

Please amend the specification as indicated below. A redlined version of the amended paragraphs is attached to this response as Appendix A.

Please replace the paragraphs identified below with the following amended paragraphs:

Page 4, paragraph no. 1011:

[1011] The data services are provided to a subscriber station on a Forward Packet Data Channel (F-PDCH), which is shared by packet data users based on time multiplexing. The F-PDCH is composed of a number of code-division-multiplexed Walsh sub-channels. The number of sub-channels varies in time depending on the demands of the circuit-switched voice and data users. The F-PDCH structure is illustrated in **FIG. 3**. The information bit stream **302** to be transmitted is segmented into packets of several sizes. A 16-bit cyclic redundancy check (CRC) is added to each packet in block **304**, and 6-bit turbo encoder tail allowance is added in block **306** yielding an encoder packet. In one embodiment, the encoder packets are of sizes 384 bits, 768 bits, 1,536 bits, 2,304 bits, 3,072 bits, and 3,840 bits. The encoder packets are encoded by block **308**. Each encoded packet is then scrambled in blocks **310** by a scrambling pattern generated by block **312** and interleaved by block **314**. Some or all of the interleaved symbols are then selected to form sub-packets in block **316**. Depending on the length of the sub-packet, the sub-packet comprises 1, 2, 4, or 8 slots. In one embodiment, the slot is 1.25 ms long. The sub-packet are QPSK, 8-PSK, or 16-QAM modulated by block **318** and demultiplexed into a variable number of pairs (In-phase and Quadrature) of parallel streams by block **320**. Each of the parallel streams is covered with a distinct 32-ary Walsh function by blocks **322(i)**. The Walsh-coded symbols of all the streams are

summed together to form a single In-phase stream and a single Quadrature stream by block **324**. The In-phase stream and the Quadrature streams are provided to a block **326**, which adjusts the channel's gain. Several forward link channels, both data and voice are then summed in block **328**, quadtrature spread in block **330**, and the resultant In-phase and Quadrature streams are baseband filtered in block **332(i)**, upconverted in blocks **334(i)** and summed in block **336**.

Page 12, paragraph no. 1052:

[1052] In accordance with another embodiment, illustrated in **FIG. 5**, the slot(s) **502(i)** of the sub-packet **500** contain data for several subscriber stations. Data from all the slots **502(i)** of the sub-packet **500** for a particular mobile are sent using one or more of the available Walsh channels. As illustrated in **FIG. 5**, slots **502(1)-502(n)** contain data encoded by Walsh codes **504(1)-504(m)**, therefore, carry data for *m* subscriber stations. Consequently, the number of subscriber stations receiving information concurrently may be changed on a sub-packet to sub-packet basis.

Page 14, paragraph no. 1057:

[1057] Each of the CDM channels **608(i)** comprises information enabling the subscriber station to determine which of the CDM channels **608(i)** is intended for the subscriber station and information enabling the subscriber station to demodulate the F-PDCH. The information enabling the subscriber station to determine which of the CDM channels **608(i)** is intended for the subscriber station comprises a MAC ID **610(i)**. The information enabling the subscriber station to demodulate the F-PDCH comprises an ARQ ID **612(i)**, a sub-packet ID **614(i)**, a packet size **616(i)**, and a number of Walsh channels used **618(i)**. In one embodiment, the current F-PDCCH coding and modulation is used for each of the CDM channels **608(i)**. During the post processing, each of the subscriber stations demodulates the MAC ID **610(i)** of a CDM channel **608(i)**. If the MAC ID **610(i)** indicates that the CDM channel **608(i)** does not contain

information for the subscriber station, the subscriber station ceases further post processing of the channel and repeats the procedure for the next CDM channel **608(i+1)**. If a subscriber demodulates a MAC ID **610(i)** indicating that the CDM channel **608(i)** contains information for the subscriber station, the subscriber station demodulates the remaining information, and processes the sub-packet on the F-PDCH in accordance to the gathered information.

Page 15, paragraph no. 1061:

[1061] **FIG. 7** illustrates a structure of the modified F-SPDCCH **700.** The modified F-SPDCCH **700** comprises information enabling the two subscriber stations to demodulate the F-PDCH. Therefore, the F-SPDCCH **700** comprises and MAC IDs for each subscriber stations **702(1), 702(2)**, ARQ IDs **704(1), 704(2),** sub-packet IDs **706(1), 706(2),** encoder packet sizes **708(1), 708(2),** and number of Walsh channels used **710(1), 710(2).** The structure can be further simplified if the second subscriber station is assumed to use a number of Walsh channels less than or equal to the number of Walsh channels of the second subscriber station. Then the modified F-SPDCCH **700** comprises only one of the blocks **710(1), 710(2)**.

Page 17, paragraph no. 1065:

[1065] **FIG. 8** illustrates a control channel structure the F-SPDCCH **800**, and the CDM control channel **802**. The F-SPDCCH **800** comprises an MAC ID **804**, ARQ ID **806,** sub-packet ID **808,** encoder packet size **810**, and numbers of Walsh channels used **812** for one of the possible two shared channels, and a CDM indicator **814**.

Page 17, paragraph no. 1068:

[1068] Upon receiving the modified F-SPDCCH **800,** each of the subscriber stations decodes the MAC ID **804**. If the decoded MAC ID is identical to the subscriber station's MAC ID, the subscriber station decodes the remaining information from the F-SPDCCH **800**, and processes the sub-packet of the F-PDCH in accordance with the information.

Page 17, paragraph no. 1069:

[1069] The subscriber stations, MAC IDs of which are not identical with the decoded MAC ID, decode the CDM indicator **814**. If the CDM indicator **814** indicates that no CDM control channel **802** is transmitted, the subscriber stations cease further processing; otherwise the subscriber stations decode the MAC ID **816**. The subscriber station, a MAC ID of which is identical with the decoded MAC ID acquires the remaining information from the CDM control channel **802**, and processes the sub-packet of the F-PDCH in accordance with the information. The subscriber stations, MAC IDs of which are not identical with the decoded MAC ID cease further processing.

Page 28, paragraph no. 1095:

[1095] Because all subscriber stations must reliably receive the control channel **1302(1)**, the control channel **1302(1)** is transmitted at power determined by power requirement of the subscriber station with the worst forward link quality metric. Because each of the control channels **1302(2)-1302(m)** are intended for one of the subscriber stations and the base station has an information about the subscriber station forward link quality metric, the base station transmits each of the channels **1302(2)-1302(m)** at the minimum power determined by power requirement of the subscriber station.

Page 28, paragraph no. 1096:

[1096] In one embodiment, the control channels **1302(i)** are transmitted concurrently, consequently, each of the subscriber stations accumulates data from all the channels **1302(i)**, and then post processes the accumulated data. During the post processing, each of the subscriber stations first demodulates the control channel **1302(1)** and decodes a MAC ID of block **1306(1)**. The subscriber station with MAC ID identical to the MAC ID of block **1306(1)** decodes the remaining information, and processes the sub-packet on the F-PDCH in accordance with the gathered information.

Page 29, paragraph no. 1099:

[1099] The subscriber stations with MAC ID matching the partial MAC ID of block **1308(1)** demodulate and decode the control channel **1302(m)**, to acquire the MAC ID of block **1306(m).** The subscriber station with MAC ID identical to the MAC ID of block **1306(m)** demodulates and decodes the remaining information of the control channel **1302(m)**, and processes the sub-packet on the F-PDCH in accordance to the gathered information. The subscriber station with MAC ID not matching the MAC ID of block **1306(m)** demodulates the next control channel **1302(2)** as described below. Since the subscriber station has already processed the control channel **1302(m),** the subscriber station continuing processing and encountering control channel **1302(m)** can cease further processing.

Page 29, paragraph no. 1100:

[1100] The subscriber stations with MAC ID not matching the partial MAC ID of block **1308(1)** demodulate the next control channel **1302(i)**, i.e., the control channel **1302(2)**. The subscriber station with MAC ID identical to the MAC ID of block **1306(2)** decodes the remaining information of the control channel **1302(2)**, and processes the sub-packet on the F-PDCH in accordance to the gathered information.

The subscriber stations with MAC ID matching the partial MAC ID of block **1308(2)** follow the processing as outlined with respect to MAC ID in block **1308**. (Thus, the subscriber stations demodulate and decode the control channel **1308(m-1)**, to acquire the MAC ID of block **1306(m-1)**).

REMARKS

Upon review of the subject application, Applicants discovered errors in the specification and/or claims which are corrected by this Amendment. Applicants submit that the above amendments are simply the correction of grammatical errors or the clarification of terminology. Applicants believe that no new matter is added to the application nor is the scope of the claimed invention affected.

Furthermore, Applicants believe the amendments made herein are not substantive changes nor do they require any additional work on the part of the Office. Therefore, entry of this Amendment is respectfully requested.

Should the Examiner have any questions or comments regarding these amendments, the Examiner is cordially invited to telephone the undersigned at the number provided below.

Respectfully submitted,

Dated: 16 January 2002 By: Pavel Kalousek

Pavel Kalousek
Reg. No. 44,178
Attorney for Applicants

QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, California 92121
Telephone: (858) 658-3072
Facsimile: (858) 658-2502

APPENDIX A

[1011] The data services are provided to a subscriber station on a Forward Packet Data Channel (F-PDCH), which is shared by packet data users based on time multiplexing. The F-PDCH is composed of a number of code-division-multiplexed Walsh sub-channels. The number of sub-channels varies in time depending on the demands of the circuit-switched voice and data users. The F-PDCH structure is illustrated in **FIG. 3**. The information bit stream **302** to be transmitted is segmented into packets of several sizes. A 16-bit cyclic redundancy check (CRC) is added to each packet in block **[302] 304**, and 6-bit turbo encoder tail allowance is added in block **306** yielding an encoder packet. In one embodiment, the encoder packets are of sizes 384 bits, 768 bits, 1,536 bits, 2,304 bits, 3,072 bits, and 3,840 bits. The encoder packets are encoded by block **308**. Each encoded packet is then scrambled in blocks **310** by a scrambling pattern generated by block **312** and interleaved by block **314**. Some or all of the interleaved symbols are then selected to form sub-packets in block **316**. Depending on the length of the sub-packet, the sub-packet comprises 1, 2, 4, or 8 slots. In one embodiment, the slot is 1.25 ms long. The sub-packet are QPSK, 8-PSK, or 16-QAM modulated by block **318** and demultiplexed into a variable number of pairs (In-phase and Quadrature) of parallel streams by block **320**. Each of the parallel streams is covered with a distinct 32-ary Walsh function by blocks **322(i)**. The Walsh-coded symbols of all the streams are summed together to form a single In-phase stream and a single Quadrature stream by block **324**. The In-phase stream and the Quadrature streams are provided to a block **326**, which adjusts the channel's gain. Several forward link channels, both data and voice are then summed in block **328**, quadtrature spread in block **330**, and the resultant In-phase and Quadrature streams are baseband filtered in block **332(i)**, upconverted in blocks **334(i)** and summed in block **336**.

[1052] In accordance with another embodiment, illustrated in **FIG. 5**, the slot(s) **502(i)** of the sub-packet **500** contain data for several subscriber stations. Data from all the slots **502(i)** of the sub-packet **500** for a particular mobile are sent using one or more of the available Walsh channels. As illustrated in **FIG. 5**, slots **[402(1)-402(n)] 502(1)-502(n)** contain data encoded by Walsh codes **504(1)-504(m)**, therefore, carry data for *m* subscriber stations. Consequently, the number of subscriber stations receiving information concurrently may be changed on a sub-packet to sub-packet basis.

[1057] Each of the CDM channels **608(i)** comprises information enabling the subscriber station to determine which of the CDM channels **608(i)** is intended for the subscriber station and information enabling the subscriber station to demodulate the F-PDCH. The information enabling the subscriber station to determine which of the CDM channels **608(i)** is intended for the subscriber station comprises a MAC ID **610(i)**. The information enabling the subscriber station to demodulate the F-PDCH comprises an ARQ ID **612(i)**, a sub-packet ID **[616(i)] 614(i)**, a packet size **[618(i)] 616(i)**, and a number of Walsh channels used **[620(i)] 618(i)**. In one embodiment, the current F-PDCCH coding and modulation is used for each of the CDM channels **608(i)**. During the post processing, each of the subscriber stations demodulates the MAC ID **610(i)** of a CDM channel **608(i)**. If the MAC ID **610(i)** indicates that the CDM channel **608(i)** does not contain information for the subscriber station, the subscriber station ceases further post processing of the channel and repeats the procedure for the next CDM channel **608(i+1)**. If a subscriber demodulates a MAC ID **610(i)** indicating that the CDM channel **608(i)** contains information for the subscriber station, the subscriber station demodulates the remaining information, and processes the sub-packet on the F-PDCH in accordance to the gathered information.

[1061] **FIG. 7** illustrates a structure of the modified F-SPDCCH **700.** The modified F-SPDCCH **700** comprises information enabling the two subscriber stations to demodulate the F-PDCH. Therefore, the F-SPDCCH **700** comprises and MAC IDs for

each subscriber stations **702(1), 702(2)**, ARQ IDs **[702(1)] 704(1), 704(2),** sub-packet IDs 706**(1), 706(2),** encoder packet sizes **708(1), 708(2),** and number of Walsh channels used **710(1), 710(2).** The structure can be further simplified if the second subscriber station is assumed to use a number of Walsh channels less than or equal to the number of Walsh channels of the second subscriber station. Then the modified F-SPDCCH **700** comprises only one of the blocks **710(1), 710(2)**.

[1065] **FIG. 8** illustrates a control channel structure the F-SPDCCH **800**, and the CDM control channel **802**. The F-SPDCCH **800** comprises an MAC ID **804**, ARQ ID **806,** sub-packet ID **808,** encoder packet size **810,** and numbers of Walsh channels used **812** for one of the possible two shared channels, and [the] a CDM indicator **814**.

[1068] Upon receiving the modified F-SPDCCH **800,** each of the subscriber stations decodes the MAC ID **[802] 804**. If the decoded MAC ID is identical to the subscriber station's MAC ID, the subscriber station decodes the remaining information from the F-SPDCCH **800**, and processes the sub-packet of the F-PDCH in accordance with the information.

[1069] The subscriber stations, MAC IDs of which are not identical with the decoded MAC ID, decode the CDM indicator **814**. If the CDM indicator **[X214] 814** indicates that no CDM control channel **802** is transmitted, the subscriber stations cease further processing; otherwise the subscriber stations decode the MAC ID **816**. The subscriber station, a MAC ID of which is identical with the decoded MAC ID acquires the remaining information from the CDM control channel **802**, and processes the sub-packet of the F-PDCH in accordance with the information. The subscriber stations, MAC IDs of which are not identical with the decoded MAC ID cease further processing.

[1095] Because all subscriber stations must reliably receive the control channel **1302(1)**, the control channel **1302(1)** is transmitted at power determined by

power requirement of the subscriber station with the worst forward link quality metric. Because each of the control channels **1302(2)-1302(m)** [is] are intended for one of the subscriber stations and the base station has an information about the subscriber station forward link quality metric, the base station transmits each of the channels **[1308(i)] 1302(2)-1302(m)** at the minimum power determined by power requirement of the subscriber station.

[1096] In one embodiment, the control channels **1302(i)** are transmitted concurrently, consequently, each of the subscriber stations accumulates data from all the channels **[1202(i)] 1302(i)**, and then post processes the accumulated data. During the post processing, each of the subscriber stations first demodulates the control channel **[1202(1)] 1302(1)** and decodes a MAC ID of block **1306(1)**. The subscriber station with MAC ID identical to the MAC ID of block **1306(1)** decodes the remaining information, and processes the sub-packet on the F-PDCH in accordance with the gathered information.

[1099] The subscriber stations with MAC ID matching the partial MAC ID of block **[1108(1)] 1308(1)** demodulate and decode the control channel **1302(m)**, to acquire the MAC ID of block **1306(m).** The subscriber station with MAC ID identical to the MAC ID of block **1306(m)** demodulates and decodes the remaining information of the control channel **1302(m)**, and processes the sub-packet on the F-PDCH in accordance to the gathered information. The subscriber station with MAC ID not matching the MAC ID of block **[1316(m)] 1306(m)** demodulates the next control channel **1302(2)** as described below. Since the subscriber station has already processed the control channel **1302(m),** the subscriber station continuing processing and encountering control channel **1302(m)** can cease further processing.

[1100] The subscriber stations with MAC ID not matching the partial MAC ID of block **1308(1)** demodulate the next control channel **1302(i)**, i.e., the control channel **1302(2)**. The subscriber station with MAC ID identical to the MAC ID of block

[1316(2)] **1306(2)** decodes the remaining information of the control channel **1302(2)**, and processes the sub-packet on the F-PDCH in accordance to the gathered information. The subscriber stations with MAC ID matching the partial MAC ID of block **[1318(2)]** **1308(2)** follow the processing as outlined with respect to MAC ID in block **1308**. (Thus, the subscriber stations demodulate and decode the control channel **[1318(m-1)]** **1308(m-1)**, to acquire the MAC ID of block **[1314(m-1)]** **1306(m-1)**).